



PREVENTION ENHANCE PROGRAM (PEP) WITH PROPRIOCEPTIVE TRAINING ON THE RECURRENCE OF ACL INJURY FOR POST-ACL RECONSTRUCTION AMONG FOOTBALL PLAYERS

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BACKGROUND: Studies shows that Anterior Cruciate Ligament (ACL) is more prone for injury among football players, Reconstruction surgery is most commonly done for torn ligament. Reports shows that injury to the ACL is happened even after rehabilitation of ACL reconstruction. Among ACL reconstruction Rehabilitation Football players, it has not been established whether a Prevention Enhance Program (PEP) sports specific training program or Proprioceptive training will consistently prevent the recurrence of ACL injury.

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PUPROSES: The Qualitative study to compare whether a PEP program or Proprioceptive training which is more effective to Prevent the recurrence of ACL injury after ACL reconstruction surgery rehabilitation.

METHODS: The comparative study included thirty football Players were randomly allocated into two group: Group –A (15) PEP program and Group-B (15) Proprioceptive training for 1 month. At baseline and after the treatment session participants were assessed with two outcome measures, The International Knee Documentation Committee (IKDC Questionnaire) and vertical drop jump test. The data were statistically analyzed using SPSS 25.

RESULTS: The result of the study shows that there is significance preventing recurrence of ACL injury for Group A (PEP) training than Group B (Proprioception) in terms of IKDC Questionnaire and vertical drop jump with the significance level ($p < 0.0001$).

CONCLUSION: PEP program and Proprioceptive training are effective in preventing recurrence of ACL injury after ACL reconstruction surgery rehabilitation. When comparing both, the PEP program demonstrated better outcome than Proprioceptive training.

KEY WORDS: ACL reconstruction, Football players, PEP Program, Proprioceptive Training, IKDC, vertical drop jump.

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INTRODUCTION

Anterior cruciate ligament injury is the most common injury in football players that on a cereal is a most severe injury for football players which is not allowed the players to return to the sports activity as like the previous level of game the reconstruction surgery plays an important role in treating the torn anterior cruciate ligament

Among all knee injuries about 86.5 percentage of injuries were ACL injury, further complete tear of ACL is more common than any other type of ACL injury

The secondary ACL injury after ACL reconstruction is not uncommon about 17.8% of players sustained second injury after ACL reconstruction surgery within 5 years of time in which 9.3 % of football player have same side graft rupture and 8.5 % have opposite side a ACL rupture was found which states that one among the five football players been affected with second time a ACL injury followed by a cell reconstruction surgery for ACL tear².

After rehabilitation using a gold standard protocol and achieving good mechanical stability even with ACL injuries due to altered kinematics and reduced proprioception, performing neuromuscular biomechanical training along with strength and conditioning is required to prevent the second injury after ACL reconstruction, the right one Intake and neuromuscular training play a significant role in knee injury prevention, especially ACL prevention programs have a 52% risk reduction in female athletes and an 85% risk reduction in male athletes.

Prevention injury and enhance performance program reduced the risk of anterior cruciate ligament injury in both the first time injury and also prevent the second injury after ACL

reconstruction the peep training program focuses on neuromuscular control that prevents the risk of injury of anterior cruciate ligament particularly who had already recovered from an incidence of PCL injury the program focuses on neuromuscular training which includes stretching strengthening Plyometric and Agility exercises.

Proprioception training which includes where is 144 exercises to improve the joint position sense also the moment sense which also improve the balance many studies suggest to include proprioception training alone or can be used as, one of the ACL training program protocol to prevent the ACL injury and recurrence of ACL injury

International knee documentation committee score is used to assess the maximum activity level especially in sports it is a reliable tool to assess the knee function without elicit any pain for the patient it can be used at various level of assessment like pre injury post injury and post-operative knee joint that is have high reliability and validity for measures the players who returned to sports and not return to sports activity followed by ACL reconstruction IKDC gives ask the scores in percentage calculation

Single leg hop test is one of the tool used to predict the ACL injury it has forward medial and rotational hop test and all were found more reliable to find the asymmetry of limp after ACL reconstruction injury surgery single leg hop test assessed after 6 month of ACL reconstruction will predict the success and success of surgery after one year

The need of this study is to find the effective exercise program which prevent the recurrence of ACL injury Hence this study compare the effect of prevention injury and enhance



program with proper reception training by using International knee documentation committee score and single leg hop test as an outcome measure on prevention of recurrence of ACL injury after ACL Reconstruction surgery who underwent a six month Rehabilitation.

MATERIALS AND METHODOLOGY

Participants:

In a Quasi experimental study, Football players ages between 18 to 25 who have underwent six months of Rehabilitation program after ACL Reconstruction surgery were included. Players with any other lower limb injuries were excluded. Informed consent form was collected from 30 subjects and individuals who fulfills the selection criteria and they were randomly allotted into two groups, Group A (n=15), Group B (n=15).

Group A:

Subjects were treated with Prevention Injury Enhancement program (PEP) about 3 times a week upto 8 weeks. PEP training includes 2 minutes of warm up includes line to line jogging, backward running, high knee running, bottom taps. 7 minutes of Strengthening with walking lunges, Russian hamstrings, single toe raise, Theraband Glut Activation, Theraband crab walk, 3 minutes of Plyometric exercises like lateral jump over cone, forward - backward jump over cone, single leg hop over cone, vertical jump over headers, scissor jump. 2 minutes of agility drill with grape vines and box run. 8 minutes of Stretching includes hamstring stretch, lower limb neural stretch, hip flexor stretch, quad stretch, adductor stretch, oblique abdominal stretch.

Group B:

Subjects were given with Proprioception training consisted of 2 minutes of Warm up exercises followed by 15 minutes of single leg

squat, cross walk, single leg stand on balance board, lunge lean hold, form bar walking.

Outcome measures:

International Knee Documentation Committee score is used to assess the maximum activity level especially in sports. It is a reliable tool to assess the knee function without elicit any pain for the patient and can be used at various level of assessment like pre injury, post injury and post – operative knee joint. IKDC have high reliability and validity for measures the players who returned to sports and not return to sports activity followed by ACL reconstruction. IKDC gives the scores which have to convert into percentage for calculation.

Single Leg Hop Test:

Single leg hop test is one of the tool used to predict the ACL injury. It has forward, medial and rotational hop test. It is the reliable tool to find the asymmetry of limb after ACL reconstruction surgery. Single leg hop test assessed after 6 month of ACL reconstruction will predict the success and unsuccessful of surgery after one year.

STATISTICAL ANALYSIS:

The sample size was analyzed statistically using SPSS 20.0. The driven data were expressed as Mean and Standard Deviation. Within the group analysis were done by student's t- test and non-overlapping data between the groups were analyzed using independent sample t-test. $P < 0.01$ was accepted as statistical significant for all analysis.

RESULT:

Within the group analysis of Group A and Group B using paired 't' test for IKDC (Table 1) shows the value of t is 14.793946 ($p < .001$) and 17.289915 ($p < .001$) respectively. Within the group analysis of Group A and Group B using paired 't' test for Single leg hop test (Table 2)



shows the value of t is -18.834085 ($p < .001$) and is -14.649894 ($p < .001$) respectively. Table 3 depicts between the group analysis of Group A and Group B using unpaired 't' test for IKDC shows the t-value is 5.11633. The p-value is .001. Between the group analysis of Group A and Group B using unpaired 't' test for Single leg hop test shows the value of t is - 7.99096. The p-value is $< .001$. This study shows both group A & B shows significant effect on IKDC and SLHT. Whereas Group A (PEP) is effective when compared to Group B (Proprioception).

DISCUSSION:

The primary purpose of this study was to elicit the effective treatment option for post ACL rehabilitation among football players which may ensure their returning to sports by preventing the recurrence of injury. A systematic review study done by, Herman et al., 2012, reported that the PEP program was the most effective in reducing ACL injuries and was also shown significantly reduce the risk of recurrence in those with previous noncontact ACL injuries. Wolf Petersen et al., (2005) conducted the study on handball players to prevent the ACL injury with Proprioception and neuromuscular intervention that study proved that the administration of proprioception training prevents the ACL injury and recurrence of injury. This study was selected to compare the effect of PEP training with Proprioception training on preventing the recurrence of ACL injury for football players who underwent ACL rehabilitation followed by ACL reconstruction 6 months ago. The training for 8 weeks were administer for both A and B. It shows the PEP training will be more beneficial than the Proprioception training on both IKDC and SLHT as outcome.

CONCLUSION:

Prevention injury Enhance Program and Proprioceptive training are effective in preventing recurrence of ACL injury after ACL reconstruction surgery rehabilitation. However, the PEP program is significant more than that of the Proprioceptive training. Therefore it is concluded that incorporating PEP training along with the ACL rehabilitation protocol will prevent the recurrence of injury after ACL Reconstruction.

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CONFLICT OF INTEREST:

There was no conflict of interest in this study.

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Table 1:

IKDC		MEAN	SD	T- VALUE	P- VALUE
PEP Training	PRE TEST	59.06	9.96	14.79	< 0.01.
	POST TEST	69.16	10.37		
Proprioceptive Training	PRE TEST	62.07	9.96	1.62	< 0.01.
	POST TEST	68.68	10.13		

Table 2:

SINGLE LEG HOP TEST		MEAN	SD	T- VALUE	P- VALUE
PEP Training	PRE TEST	17.93	2.35	18.83	< 0.01
	POST TEST	13.00	1.72		
Proprioceptive Training	PRE TEST	17.52	2.02	14.64	< 0.01
	POST TEST	15.07	1.05		

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Table 3:

		MEAN	SD	T- VALUE	P- VALUE
IKDC	PEP Training	10.1	97.88	5.116	< 0.01
	Proprioceptive Training	6.16	26.66		
SINGLE LEG HOP TEST	PEP Training	4.93	14.37	7.99	< 0.01
	Proprioceptive Training	2.45	5.86		

